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Exploring possible mechanism of homoeopathic potentization by Nanoparticle-Exclusion Zone Shell model

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Abstract
Homoeopathy is a form of nanopharmacology. Potentization was the most significant, although controversial amongst Hahnemann's discoveries. Homeopathy is debatable because high-potency medications have large dilution factors that are several orders of magnitude more than Avogadro's number, implying that no measurable residues of the initial components should exist. Nature and bioactivity of serially diluted and succussed solutions used in homoeopathy could be explained using the Nanoparticle-Exclusion Zone Shell Model (EZ). During dilutions, nanoparticles adsorb the source drug, altering their structure and surround themselves with modified EZ shells. Both altered nanoparticles and their modified shells contain the source medication. During forceful strokes, modified EZ shells strip off and distribute as further modified EZ templates to nanoparticles and modifying their structures accordingly. As a result, source drug information develops beyond Avogadro's calculations when it moves from one dilution to the next. During trituration lactose plays very important role to promote intracellular transport as well as acts as stabilizer. New concepts are discussed in this paper, leading to a new hypothetical model for properly understanding the memory retention phenomenon and homoeopathic medicine. This paper aims to review EZ shell model hypothesis on the scientific basis of homoeopathic medicine and research opportunities.

Keywords: Exclusion zone shell model, homoeopathy, nanoparticle, potentization

Introduction

Homoeopathy is a medical system developed by Dr. Christian Friedrich Samuel Hahnemann. It has faced numerous debates and recurrent challenges from the scientific community, including questions about its efficacy and the physical existence of the beginning material in extreme dilutions. Homeopathy is distinguished by Hahnemann's discovery of potentization. Potentization is a technique in which medicinal compounds are triturated or succussed in a precise ratio, such as 1:99 in centesimal scale and 1:9 in decimal scale, in a medium of sugar of milk or 90% ethyl alcohol. Source drug components that are soluble in water or alcohol are used in liquid potentization. When the source substance is insoluble in water or alcohol, the source drug is solid potentized (triturated) to increase its potencies. This process can be repeated indefinitely, even well beyond Avogadro's limit.

How are homoeopathic remedies active when they are administered at extreme dilutions, often well above Avogadro's number, where the presence of even traces of the beginning components is unimaginable? This is a common scientific question. Several hypotheses involving liquid memory, clathrate formation, and quantum physical characteristics have been proposed to explain the above topic. However, these hypotheses have been heavily criticised due to their lack of evidence and speculative character. High diluted medicines seems "medicines without molecules" The goal of this research is to discuss a model that can explain several interesting findings –

- There is no therapeutic efficacy in a mere dilution without succussions.
- An insoluble source medication becomes "soluble" after 3C trituration.

According to basic science studies, conventional homoeopathic medicines comprise detectable source nanoparticles (NPs) and/or silica nanoparticles with adsorbed source materials that are scattered heterogeneously in colloidal solution [1]. Memory of unique water structures, water-ethanol clusters, epitaxy, and nanobubbles, glass-derived silica structures, electromagnetic theory, quantum macro entanglement, stressor effects, and hormesis are

some of the hypotheses on homoeopathic remedy action [2].

Speciality of nanoparticle

Nanoparticles have higher surface areas than similar masses of bigger-scale materials. As surface area per mass of a material grows, a greater portion of the material can come into contact with surrounding materials, capable of adsorbing other components in solution onto the particle surface, so changing the particle characteristics. Sometimes, these attempts are called doping of the nanoparticle [3, 4]. Many of the inner workings of cells naturally occur at the nanoscale. For example, haemoglobin, the protein that delivers oxygen around the body, is 5.5 nanometers in diameter. A strand of DNA, one of the building elements of human life, is only around 2 nanometers in diameter [5]. There are considerable influence of numerous chemicals in very small dosages in our human body such as Interleukin-1 for T-cell clone proliferation: 2.5 x 10^{-19} mol/L (similar to 19X in decimal scale of homoeopathic dilution). In this regard, current research suggests that homoeopathy leverages the organism's reaction to (or secondary action of) toxin/ stressor perhaps via its particular information contained in nanoparticles and interfacial water on them as nanoparticle-exclusion zone shells [3].

Potentization

Trituration and succussion may be simple manual methods that create nanoparticles of source material. However, much of the nanoscience research focuses on the unique features of nanoparticles [2]. Any low potency homoeopathic remedy created above mother tinctures, i.e., 1X to 23X or 1C to 11C, should theoretically still contain bulk-form molecules of source material as well as source nanoparticles. In theory, consecutive dilution processes should leave fewer and fewer bulk-form source material molecules in a real solution, until none should remain in a solution diluted beyond Avogadro's number (6 x 10^{23}), i.e., potencies greater than 24X or 12C [6].

Formation of Ez Water

It was discovered that the previously known water H_2O was "bulk water," and that there is a new phase of water, H_3O_2, that is liquid crystalline in nature and about which little is known. It creates exclusion zones that keep almost anything floating or dissolved in water out. Its features are so unusual that it is appropriately referred to as the fourth phase of water [7]. In serially diluted aqueous succussed solutions of polar solutes, the exclusion zone of water is massive supramolecular water structures. There is no silicon or other pollution in these stable formations. Now comes the question of whether this water can retain information. The information coding could be accomplished by removing oxygen atoms from the generic EZ's hexagonal lattice without compromising its structural integrity. Homeopathic dilutions' phenomenology is found to be extremely similar to that of EZ water [6].

What happened during succussion

To retain information, this simple process can have tremendous scientific implications. It generates 10 kbar pressure, mixing air (oxygen) nanobubbles, mixing air (oxygen) as nanobubbles, charging particles negatively on their way. Violent strokes cause silica and other glass constituents generally act as nanoparticles to leach heavily into the solution, where they mix with other nanoparticles [6].

The source drug's Mother Solution or tincture is mixed with 99 drops of water or 90% v/v alcohol. To increase its 1C potency, it is given a further 10 forceful strokes. Source drug material is still available in solution at initial potencies up to 3C (or 6X). During potentization, EZ shells are removed from nanoparticles in the solvent. During this time, the nanoparticles absorb the drug source. The adsorbed source medication changes the nanoparticle structure. Because adsorbates can affect the structure of any nanoscale material, and silica is particularly ideal for surface modification. The structurally modified nanoparticles, in conjunction with the adsorbed source drug as a nucleator, form modified EZ shells around them [6].

The nanoparticle and its EZ shell acquire source medication specific information up to 3C potency of the treatment through structural alterations. This data is "crude and condensed". The negatively charged EZ would generate a capacitor-like physical condition with the concentration of protons (H+) at the EZ/water interface, possibly aiding in information storage. The 3C potency is suitable for completing source drug specific information acquisition. However, at this concentration, the source medication is necessary for reinforcing or consolidation of the acquired information. However, at 4C and higher potencies, the changed nanoparticle structure and its EZ shell become stable. The potency can be increased in the same way, evolving the source drug information with each dilution [6].

Trituration

The sample powder is deformed, flattened, fragmented, and rewelded when it is trapped and crushed between the inner surface of the mortar and the pestle. The impact force breaks crystallographic connections, resulting in a new surface. The new surfaces allow particles to easily fuse together, increasing the rate of solid material breakdown. With sustained mechanical deformation, the surface energy of the material may grow, causing further substantial surface, physico-chemical, and structural changes [9]. Successions provide high turbulence, particle collisions, and shear pressures in solution, breaking down treatment source material particles and silica from glass containers or vials [10]. The first level trituration alone reduces the particle size of the source material by 80% to less than 10µm, leaving just 50µm particles [11]. This is because inorganic nanoparticles (impurities or wear on mortar and pestle surfaces) can absorb nanofractions of source material (up to 3C potency) and change their structure. These modified nanoparticles and their drug adsorbates produce modified EZ shells, extracting full source drug information up to 3C potency. EZ layers can collect water from the atmosphere [12]. From 3C triturated potency, insoluble parent drug ingredient becomes "soluble." This prevalent belief is used as a hint. Because the inorganic nanoparticles and their EZ shells have acquired all information about the "insoluble" source medication, boosting the potency to 3C is believed to be unnecessary. Lactose nanoparticles could adsorb source medication instead of inorganic nanoparticles, changing their structure. Inorganic phases, however, can easily alter structure without changing composition [8].

Importance of lactose

Lactose can behave as a "Trojan horse" on nanoparticles to

promote intracellular transport, according to traditional nano-pharmacology [13]. A crucial stabilizer, lactose effectively separates the produced nanoparticles from the bigger bulk raw material. Lactose also inhibits the aggregation of nanoclusters, which are made up of a few raw material nanoparticles embedded in a lactose mesh.

Important recent Research's

Benveniste and colleagues were unable to reproduce their findings in front of the visiting Nature team when attempting to explain the ultra high dilution "Memory of water," but it generated much controversy and even mockery for homoeopathy [14]. Subsequently, Elia and Niccoli demonstrated that the process of dilutions and succussions is capable of permanently altering the physicochemical properties of water [15]. Recently, Kokornaczyk *et al*. discovered important distinctions between evaporated water droplets from conventional "succussion" and light mild mixing of liquids [16]. A remarkable research demonstrated that a nanoparticle's structure changes at room temperature in response to changes in the surface environment, i.e. the nature of the surrounding molecules. interesting property is that the nanoparticle structure is not kinetically stuck but is reactive to environmental changes [17]. Chikramane *et al*. used transmission electron microscopy to detect nanoparticles of the starting raw material (metals). They replicated the effect using gold nanoparticles and discovered that it is dependent on the dynamic formation of air bubbles and nanobubbles during the succussion steps and is stabilised by the interaction with the lactose used in the initial trituration [18].

How Ultra-High Dilutions May Work As Nanomedicines

Small nanoparticles may easily permeate cell membranes, move around the body via blood and lymph, and even cross the blood-brain barrier. Recent biomedical research reveals that nanoparticles generate a protein corona when in contact with biological fluids. The disease-specific corona determines the biological fate of nanoparticles, including pharmacokinetics, biodistribution, and therapeutic efficacy [19]. Tavakol *et al*. even stressed the necessity for "patient-specific NPs for high yielding and safe therapeutic applications." exclusion zone shells present in the remedy can be such nanoparticles that contain drug-specific information. The nanoparticle-exclusion zone shells seen in homoeopathic medications can be individualised nanomedicines for patients [20]. Using DNA, proteins, or living cells as biological templates, nanosilica can self-assemble into 3-dimensional structures that can a type of epitaxy. The EZ may carry surface-specific information, and nanoparticles, together with their interfacial water, may memorise the source drug. Thus nanoparticle's delicate information can reach places where the nanoparticle can't. It could explain why the size (amount) of a dose in homoeopathy is irrelevant [6].

Conclusion

Before looking into the workings of serially diluted succussed solutions, it's worth considering the role of too small in Nature. "Nature uses as little as possible of anything," said Johannes Kepler. According to research, EZ water (H_3O_2) develops during homoeopathic potentization. Succussion and trituration have deep scientific meanings. The EZ shells protect the drug. However, a certain amount of impurity (or source drug) is required to start and maintain memory retention. The nanoparticle—exclusion zone shells in a patient's remedy can be personalised to interact with his specific protein corona for the best therapeutic results with the least negative effects. Exclusion Zone Shell Model is a potential mechanism of bioactivity of serially diluted succussed solutions beyond Avogadro. The dose is immaterial in homoeopathy because the medicine carries information about the source substance, not the drug itself. So this medicine is "spirit-like," as Hahnemann described it. Exploring homoeopathy in this way may lead to new research in nanoscience and water, bringing it up to speed with modern medicine. Moreover, the reported memory retention phenomena may have wider applications.

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